

## CLAIMS

1. A diaphragm 1 for a loudspeaker, *characterized in that*
  - such diaphragm 1 comprises a core 2 consisting of structural foam cut with high precision and thermomolded to the geometric shape desired for the diaphragm,
  - the exterior surface 4 is covered with at least one, preferably a plurality of, “outer plies” 5 of woven or nonwoven fibers impregnated with resin to form a laminate or “outer skin” 6,
  - The interior surface 7 is covered or not covered with one or more woven or nonwoven “inner plies” to form a laminate or “inner skin 9.”
2. The diaphragm as specified in claim 1, *wherein* the woven or nonwoven fibers forming the inner and outer plies which are selected are among the following:
  - glass fibers
  - carbon fibers, polyethylene fibers, aramides, and para-amides (Dyneema™, Spectra™, Kevlar™, Vectran™)
3. The diaphragm as specified in claim 1 or 2, *wherein* the foam constituting the core selected is among the following:
  - Plexiglass™ foam with closed cells of a density ranging from 30 to 100 kg/m<sup>3</sup>, typically 50 kg/m<sup>3</sup>

- PVC (polyvinyl chloride) foam with closed cells of a density ranging from 50 to 200 kg/m<sup>3</sup>
  - polystyrene foam with closed cells of a density ranging from 15 to 40 kg/m<sup>3</sup>
4. The diaphragm as specified in any one of claims 1 to 3, *wherein* the impregnation resin chosen is one of the following:
    - resins of the thermohardenable type: epoxy, polyester, vinylester, and phenolic ester
    - thermoplastic resins: polyamide, polypropylene
  5. The diaphragm as specified in any one of claims 1 to 4, *wherein* use may be made of different fibers and different impregnation resins, or conversely identical ones, for producing the plies, or also one combination of fibers and resin may be employed for the inner plies and another combination for the outer plies, or the same combination may be employed.
  6. The diaphragm as specified in claim 5, *wherein* the same combination is employed,
  7. The diaphragm as specified in one of claims 1 to 6, *wherein* the thicknesses of the inner and outer plies are modified by cutting the material in different thicknesses ranging from 1.5 mm to 4 mm.
  8. The diaphragm as specified in any one of claims 1 to 7, *wherein* such diaphragm exhibits a sandwich structure selected from among the following:

### **CWM-L or CWM-2P/M 1.5**

1 inner ply of glass,

foam core of a thickness of 1.5 mm

1 outer ply of glass

### **CWM or CWM-3P/M 1.5**

1 outer ply of glass,

foam core of a thickness of 1.5 mm

2 inner plies of glass

### **CWS-1P/M2**

1 outer ply of glass

foam core of a thickness of 2 mm

### **CWS-1P/M3**

1 outer ply of glass

foam core of a thickness of 3 mm

## CWS-2P/M1.5

2 outer plies of glass

foam core of a thickness of 1.5 mm

9. The diaphragm as specified in any one of claims 1 to 8 for bass-range and medium-range transducers the diameters of which vary from 48 cm to 10 cm.
10. The diaphragm as specified in any one of claims 1 to 9 for a medium-range loudspeaker, *wherein* such diaphragm consists of a core of a thickness of 1.5 mm with an outer skin of 100 microns produced from two plies of glass 50 microns.
11. The diaphragm as specified in any one of claims 1 to 9 for a woofer 33 cm in diameter, *wherein* the thickness of the core is 3 mm with an inner skin of 3 plies of 50 microns and an outer skin of two plies of 50 microns.
12. A process for manufacture of a diaphragm as specified in any one of claims 1 to 11, *characterized in that* such sandwich-structure material is polymerized either by compression between mold and countermold or by vacuum molding, at a temperature permitting polymerization of the resin and accordingly production of a mechanically uniform structure.
13. Diaphragms for loudspeakers of acoustic baffles, *characterized in that* such diaphragms are manufactured by the process as specified in claim 12.
14. Loudspeakers for acoustic baffles, *characterized in that* such loudspeakers comprise a diaphragm as specified in any one of claims 1 to 11 and 13.

15. Acoustic baffles, *characterized in that* such acoustic baffles are provided with at least one loudspeaker as specified in claim 14.
16. Applications of diaphragms, loudspeakers, and acoustic baffles as specified in any one of claims 1 to 15 for the reproduction of sounds, especially sounds of high or very high fidelity, for all private uses, in auditoriums, conference rooms, concert halls, automobiles and other land transportation vehicles, maritime or air transportation vehicles, and the like.